US006327880B1

(12) **United States Patent**
Liang

(10) **Patent No.: US 6,327,880 B1**
(45) **Date of Patent: Dec. 11, 2001**

(54) **DOOR LOCK DEVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/455,942**

(22) Filed: **Dec. 7, 1999**

(51) **Int. Cl.**[7] **E05B 63/08**
(52) **U.S. Cl.** **70/106**; 70/150; 70/470; 70/478; 70/479; 70/484; 282/142
(58) **Field of Search** 70/106, 107, 110, 70/467–470, 477–485, 150; 292/142

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(74) *Attorney, Agent, or Firm*—Bacon & Thomas PLLC

(57) **ABSTRACT**

A door lock device is disposed on a door (**1**). The door (**1**) has an upper through hole (**11**) and a lower through hole (**12**). The door lock device has a latch bolt device (**6**) disposed on the door (**1**), a case frame (**2**) having an upper hollow cylinder (**22**) inserted through the upper through hole (**11**) and a lower hollow cylinder (**23**) inserted through the lower through hole (**12**), a first pressing plate (**8**) disposed on the case frame (**2**), a core (**3**) disposed in the upper hollow cylinder (**22**), a lock fastener device (**4**) disposed in the upper hollow cylinder (**22**), and a drive mechanism (**5**) disposed in the upper hollow cylinder (**22**). The drive mechanism (**5**) has a rack (**53**) to drive the latch bolt device (**6**). A locking plate (**71**) covers the upper through hole (**11**) and the lower through hole (**12**). A decoration plate (**72**) is disposed on the locking plate (**71**). A second pressing plate (**8'**) is disposed on the decoration plate (**72**).

2 Claims, 11 Drawing Sheets

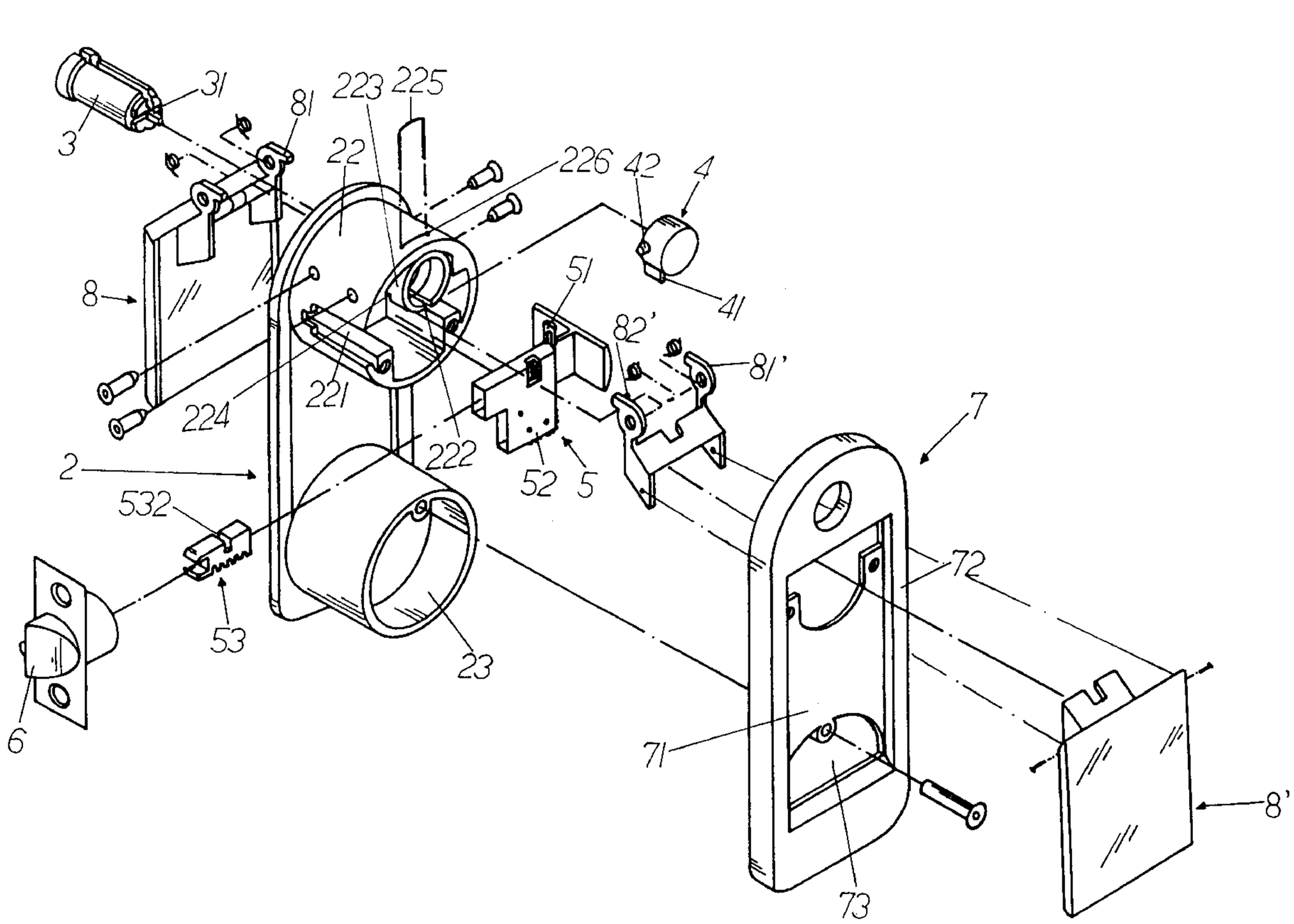


FIG. 1

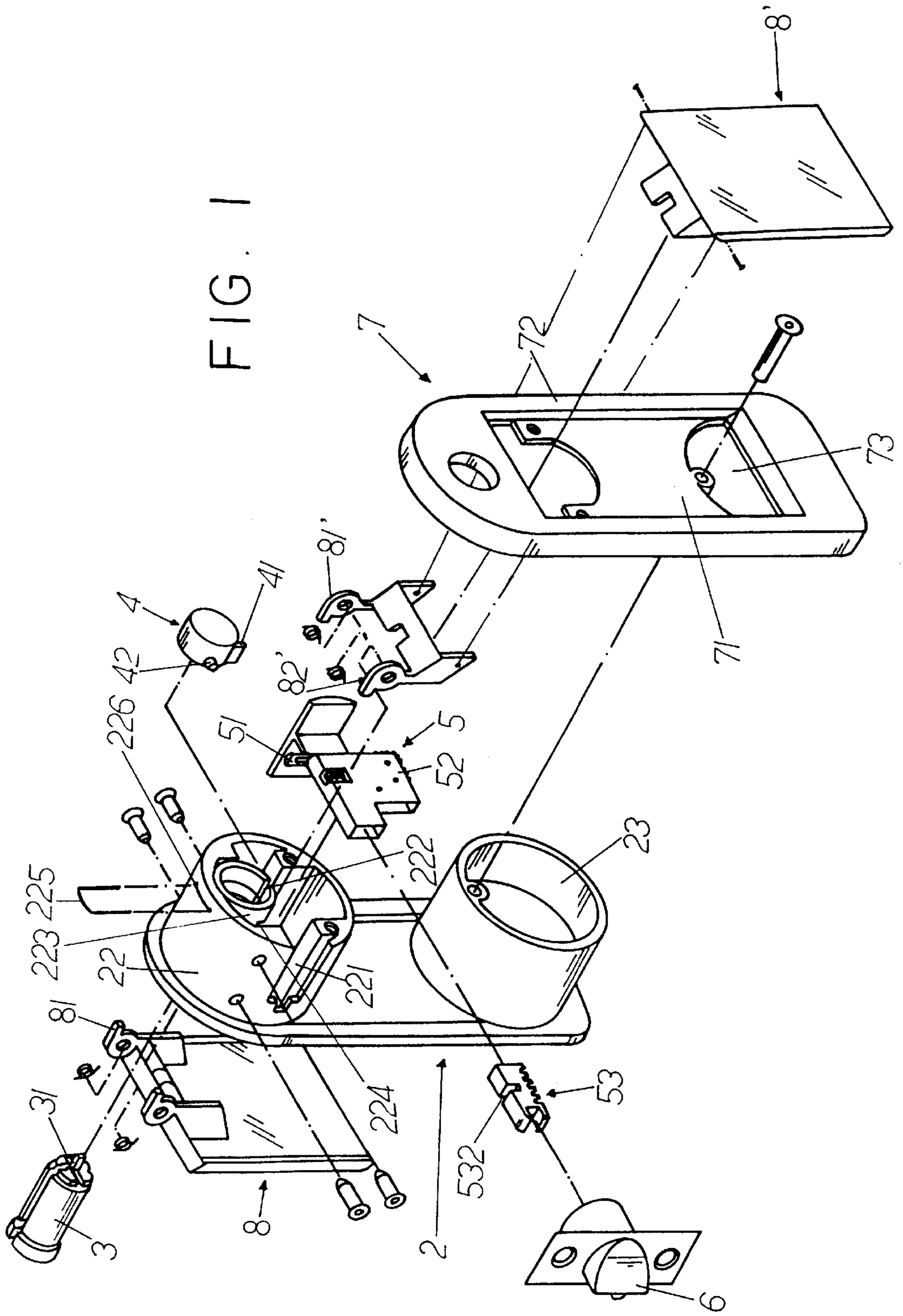
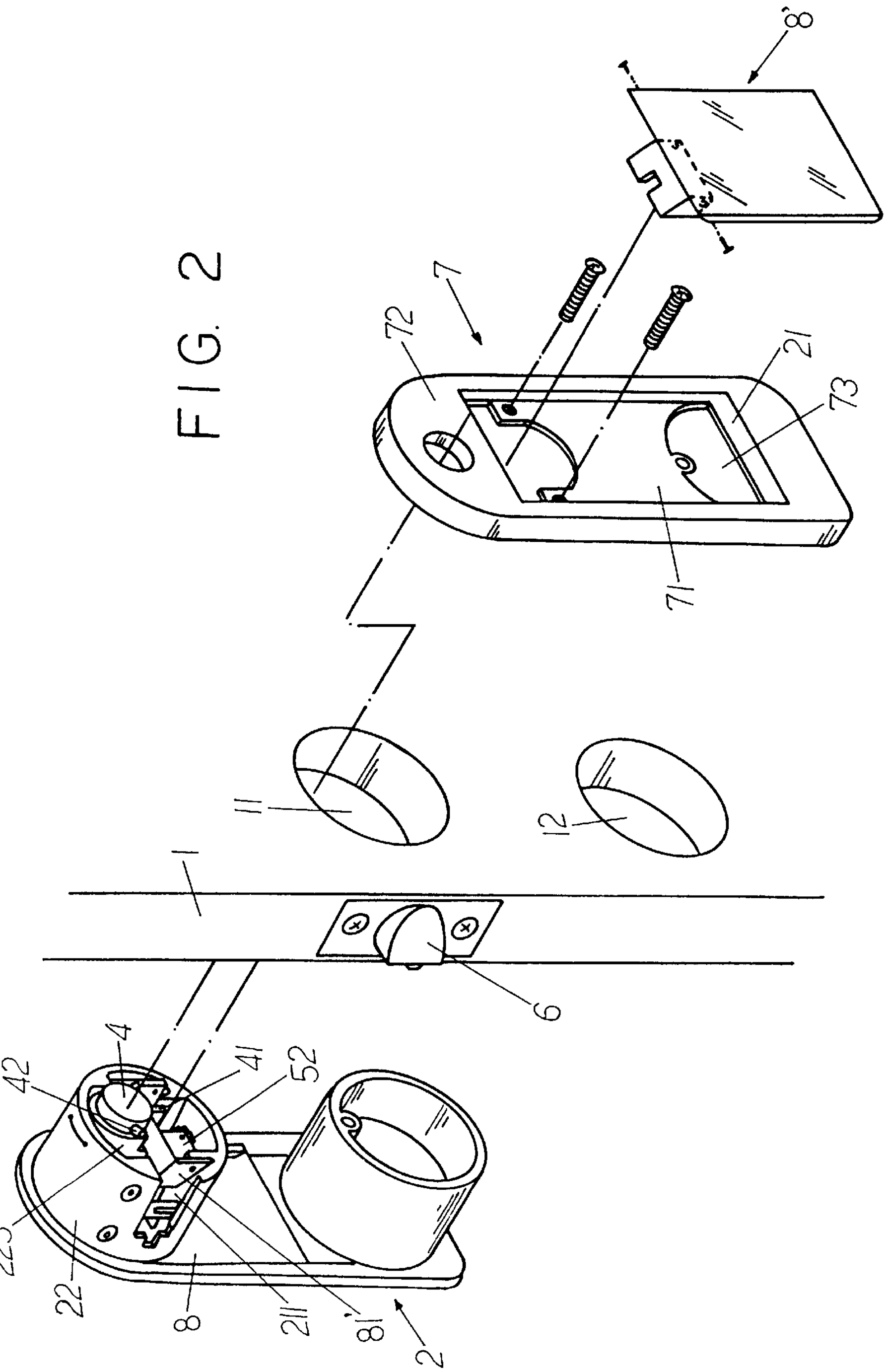

∞
72
7
73
71
81'
41
4
42
82'
226
51
5
52
225
223
22
221
23
222
81
31
224
53
532
8
2
3
6

FIG. 2



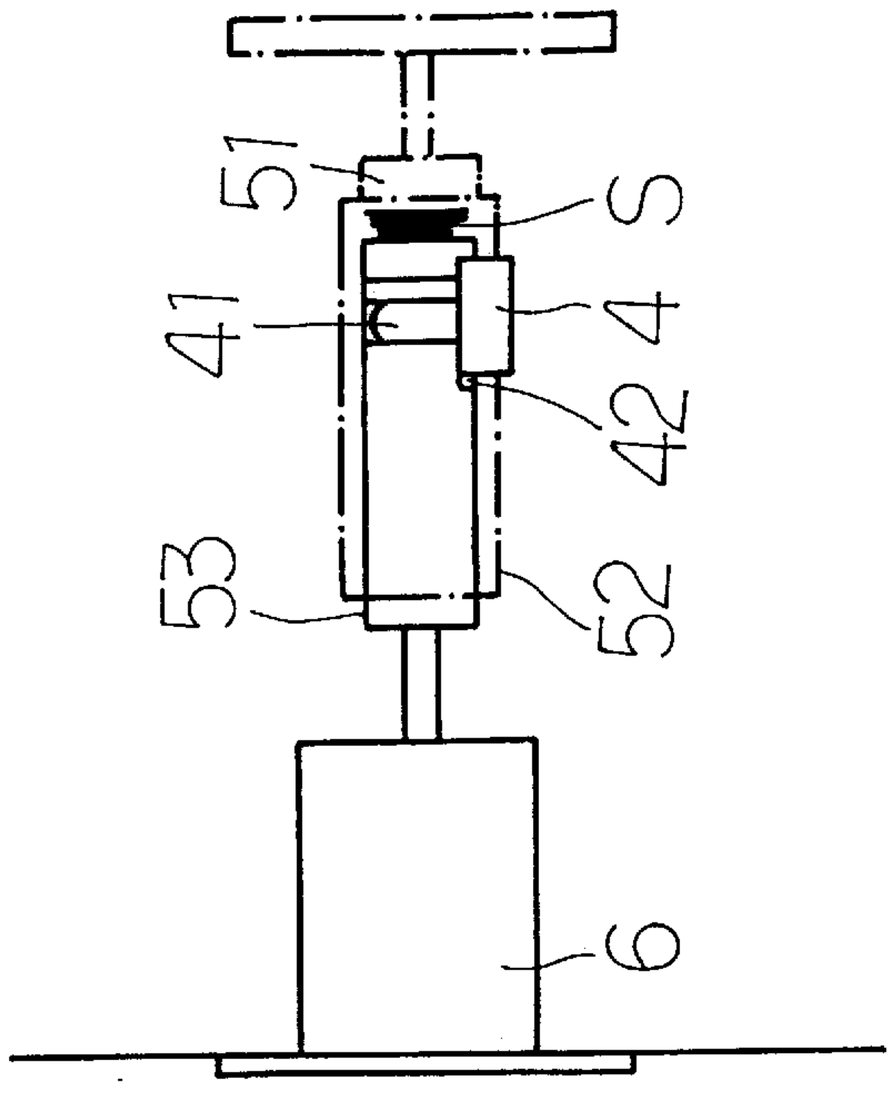


FIG.3B

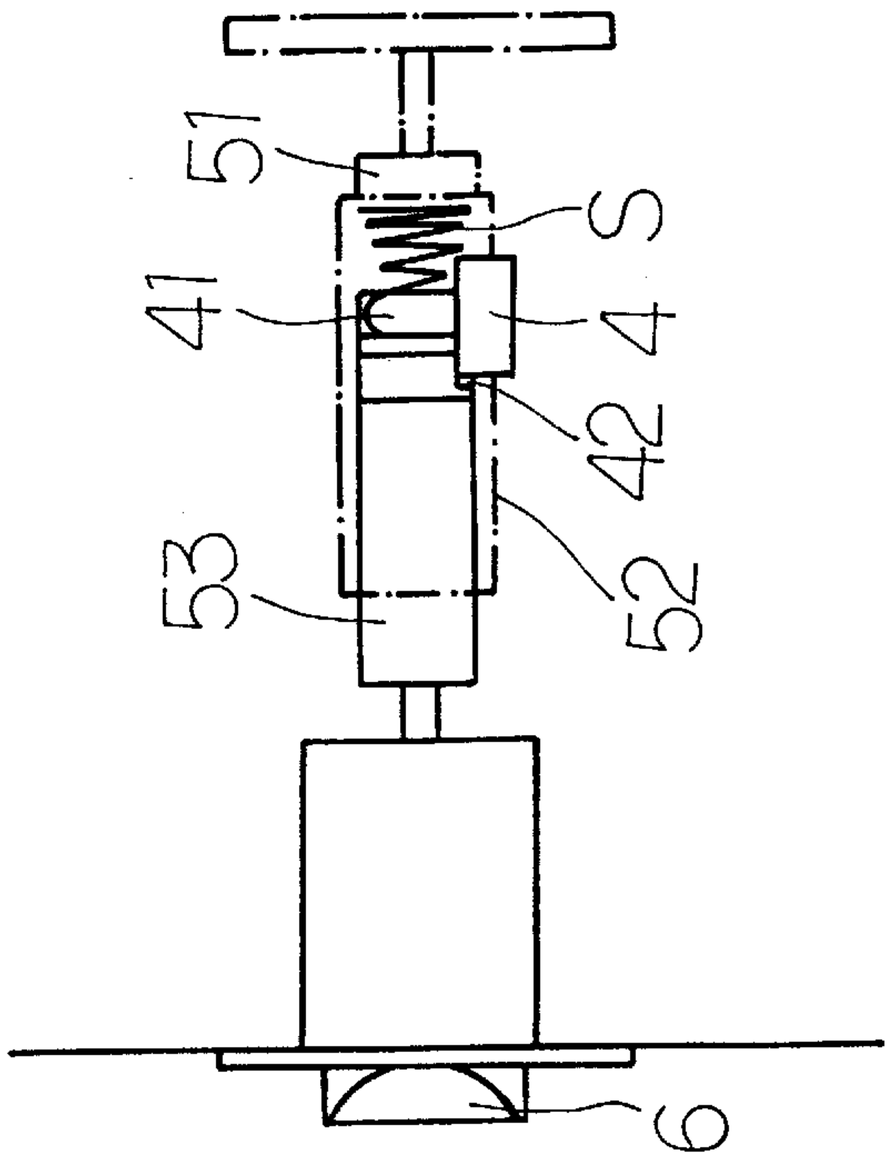
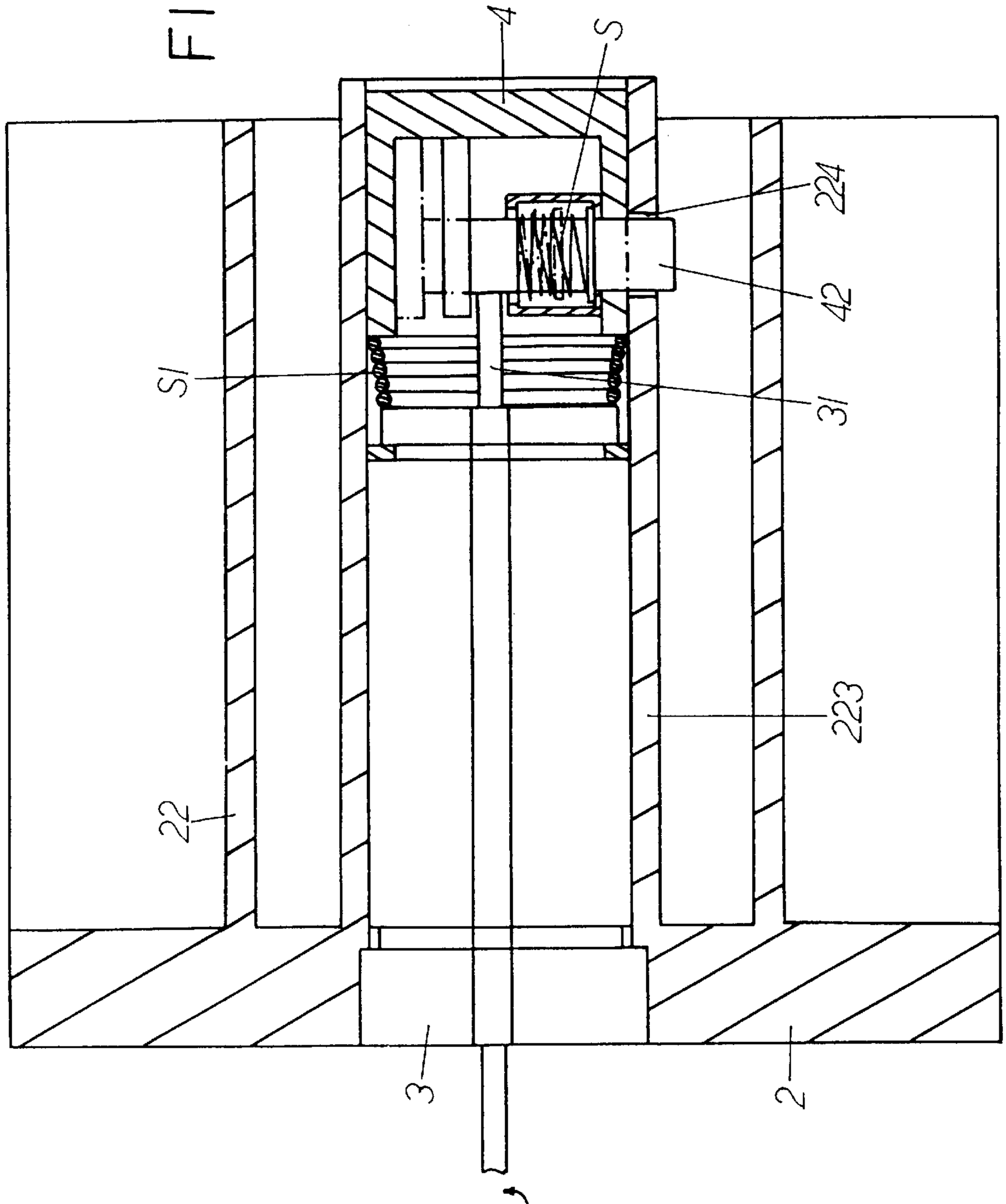


FIG.3A

FIG 4A



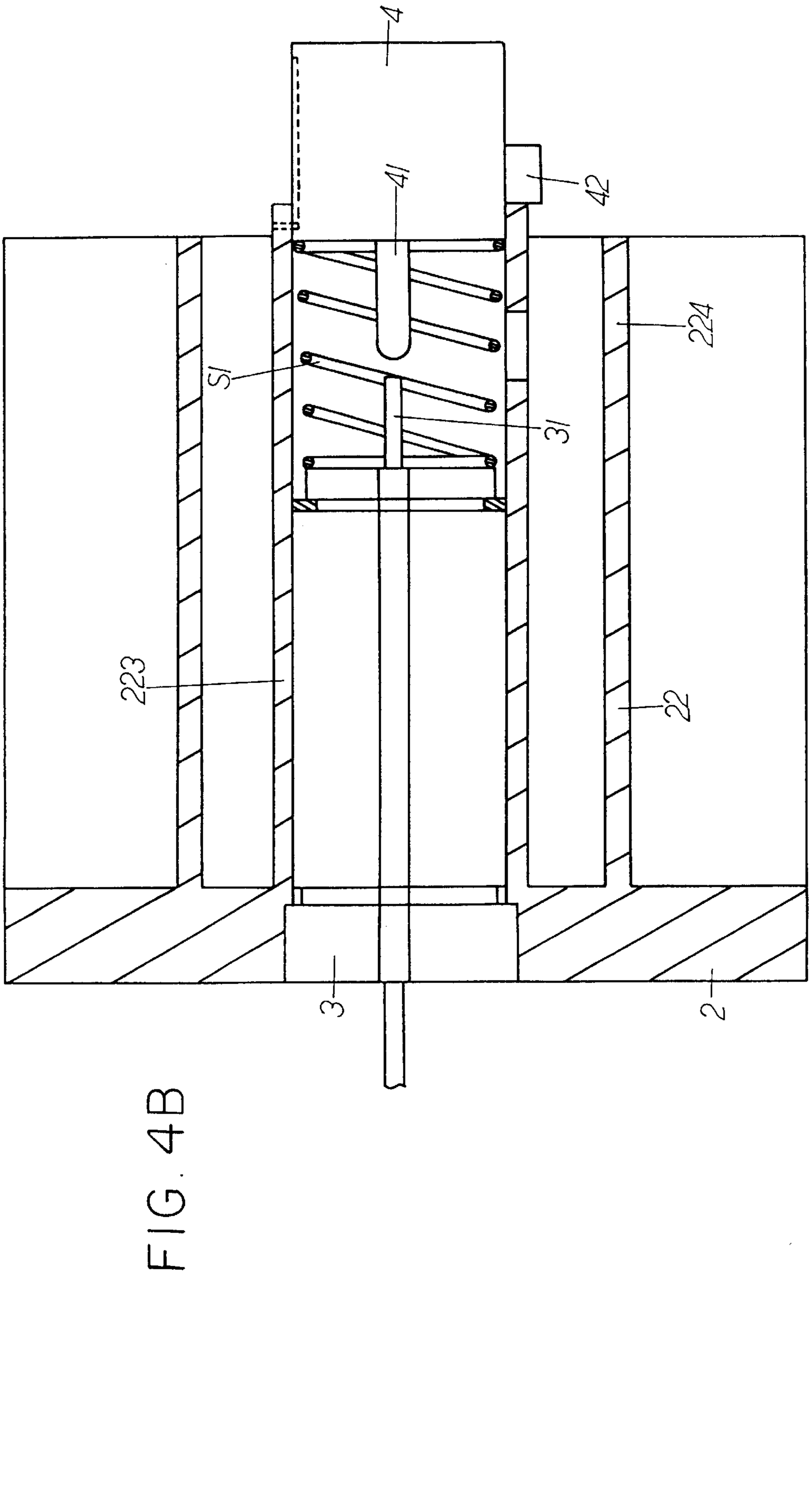


FIG. 4

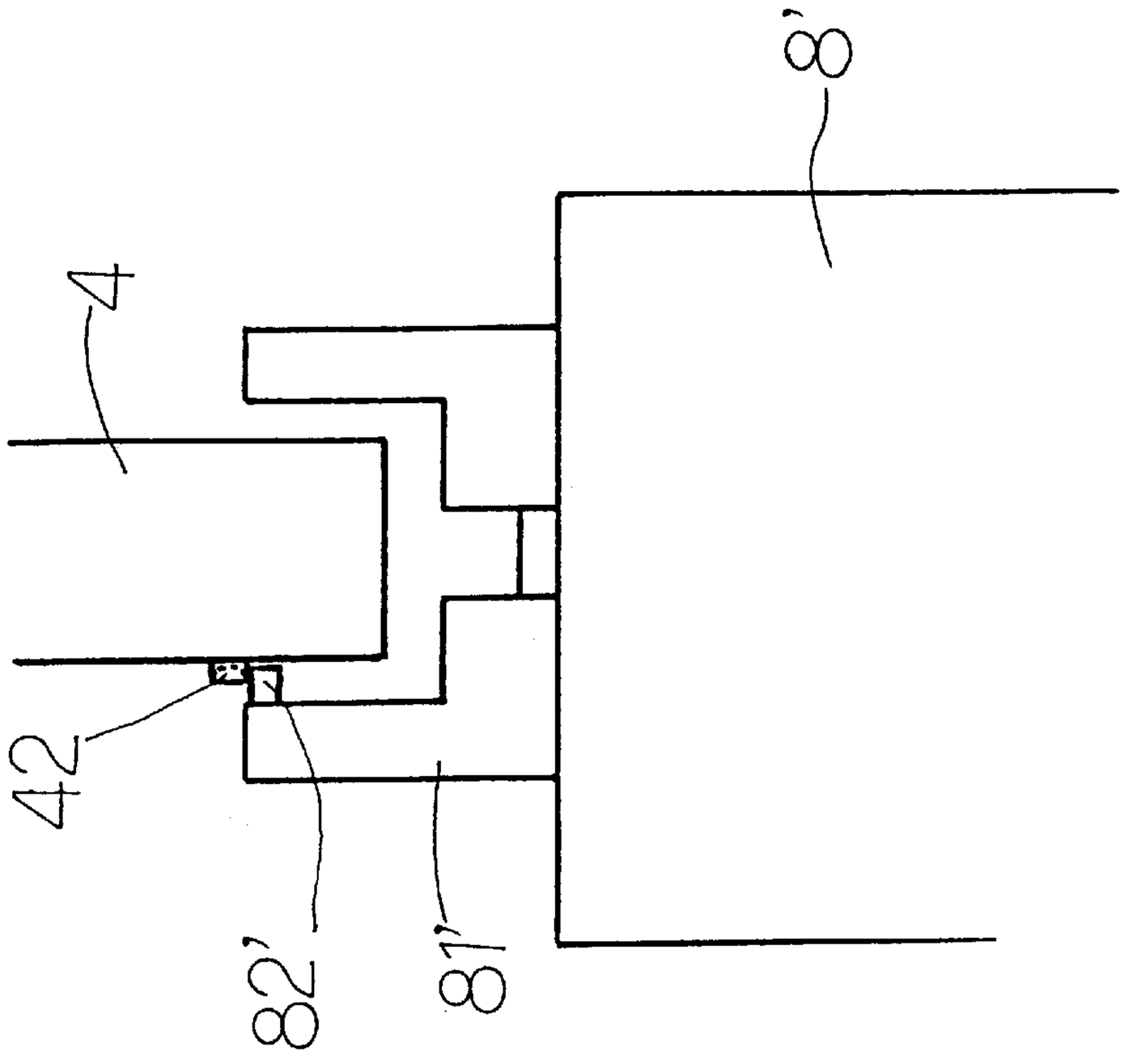


FIG.5

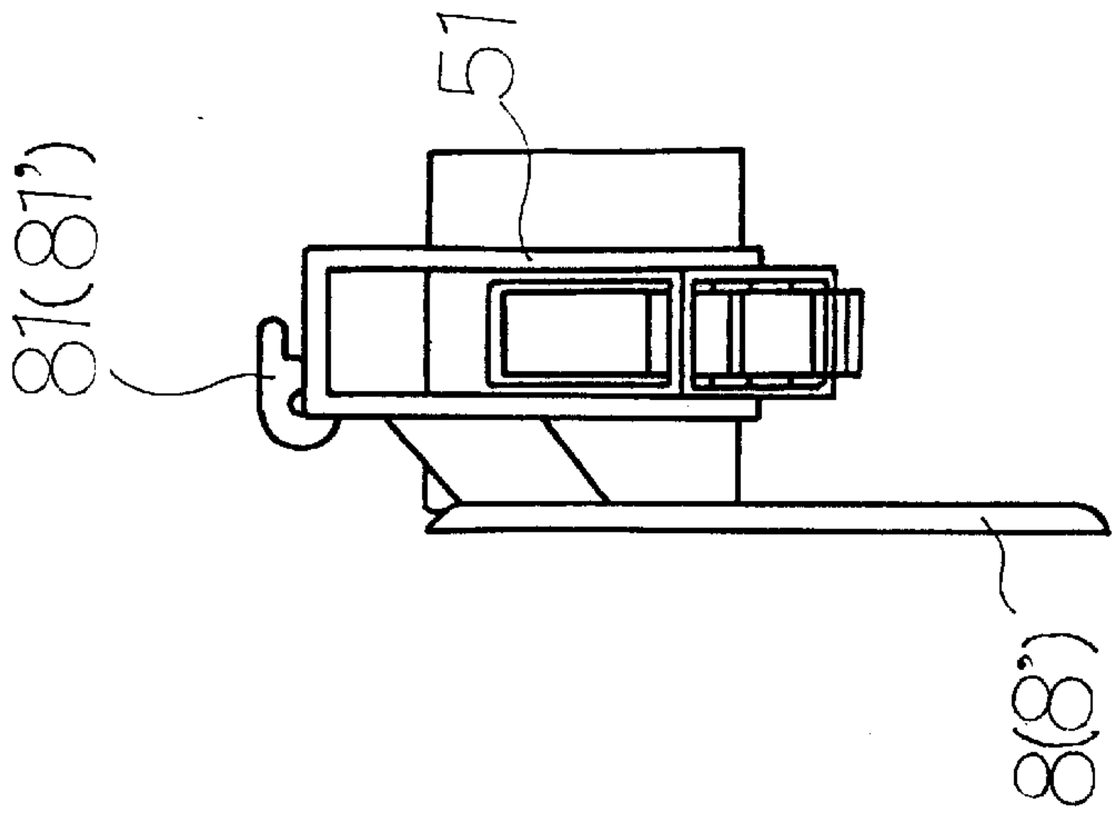


FIG.6A

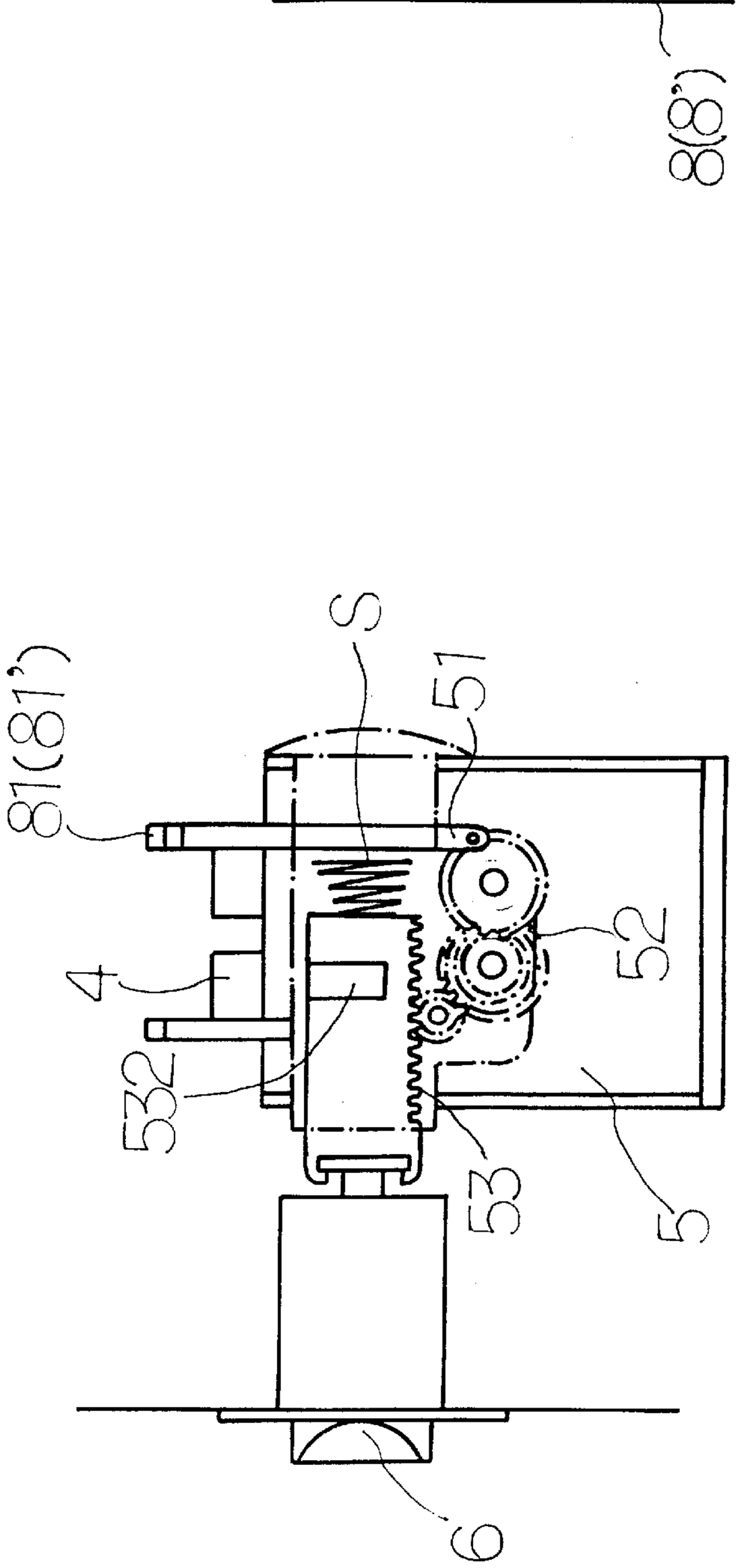


FIG.6B

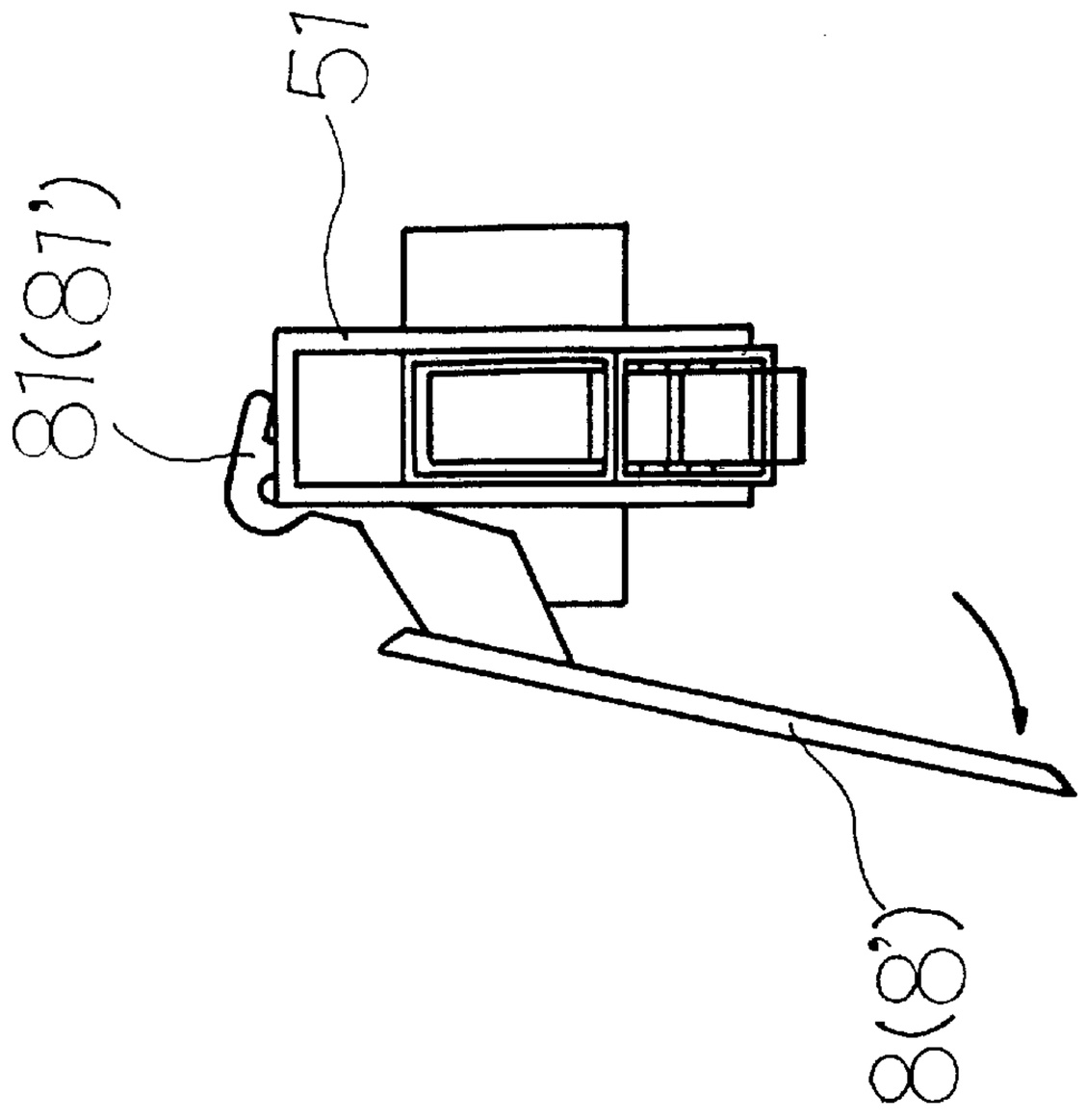
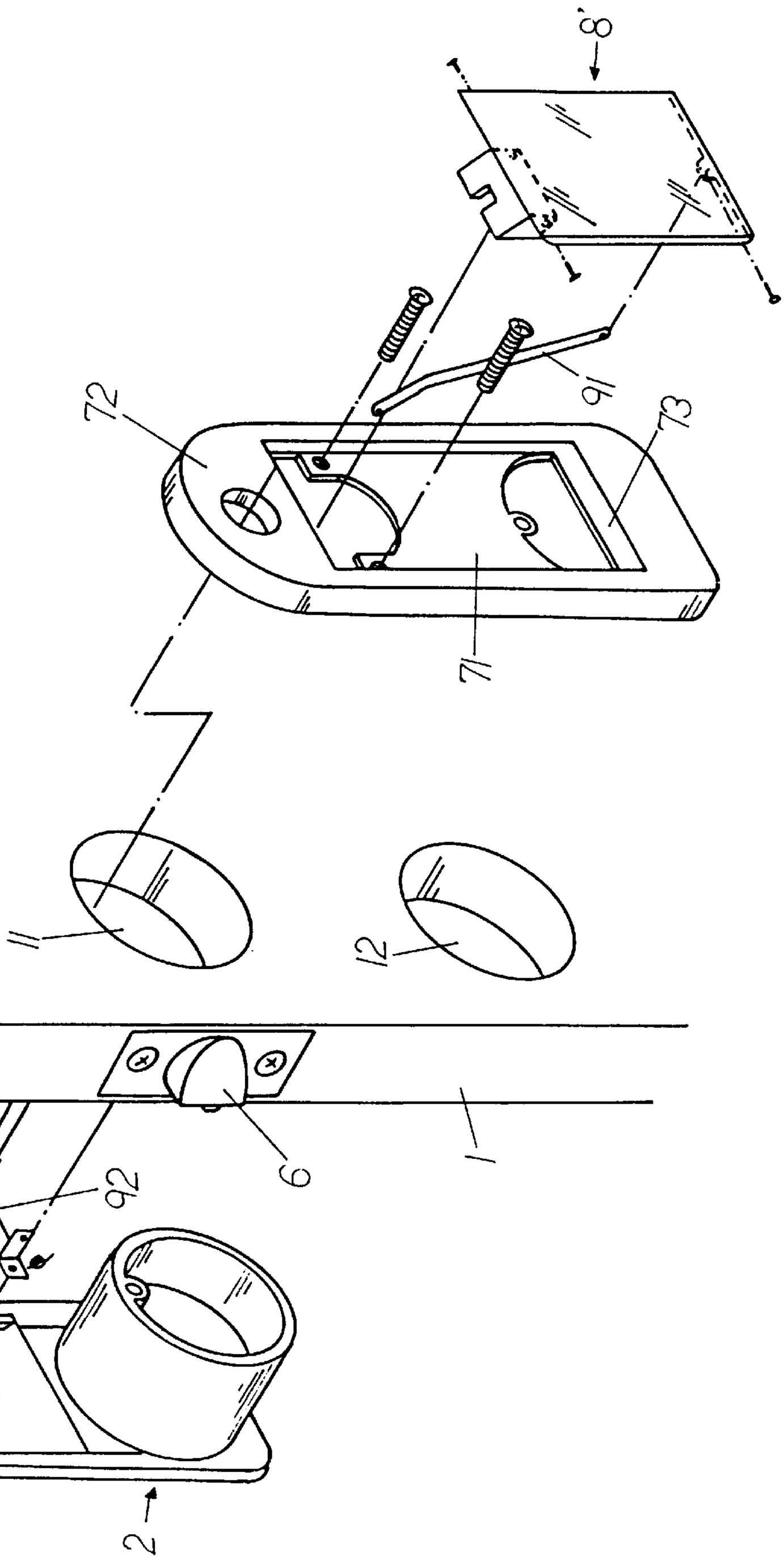


FIG.7A

FIG.7B

FIG. 8



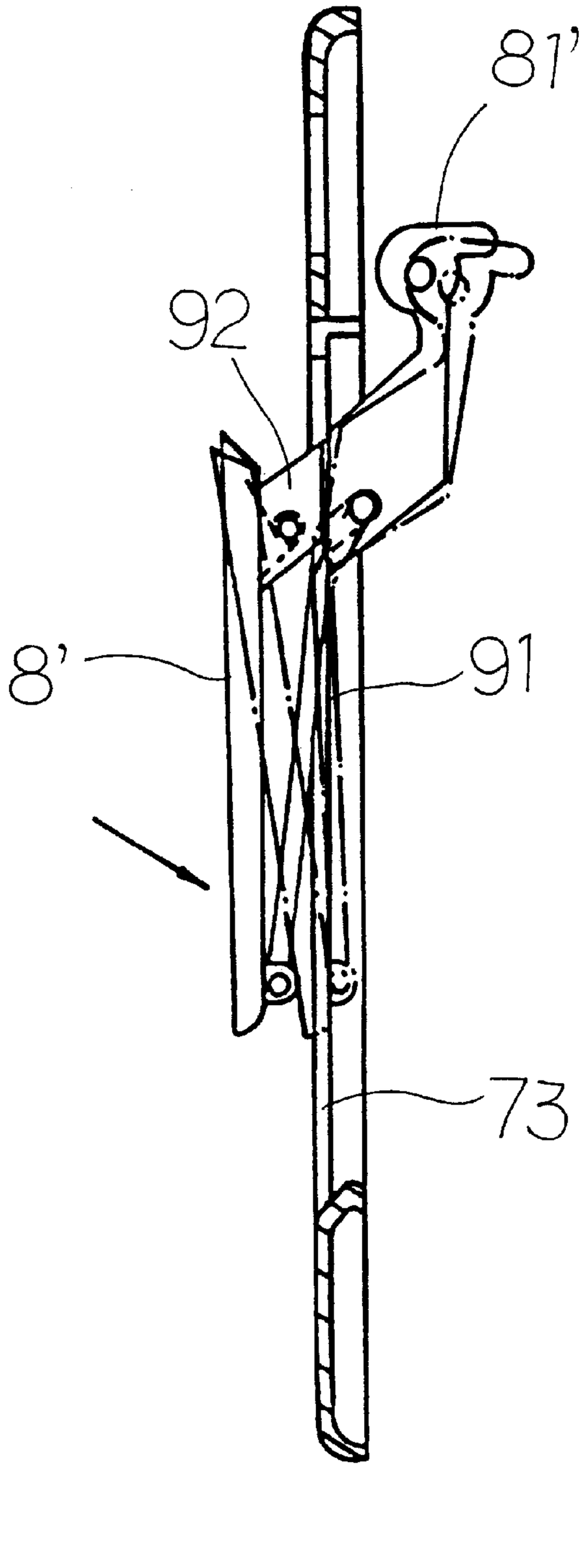


FIG.9

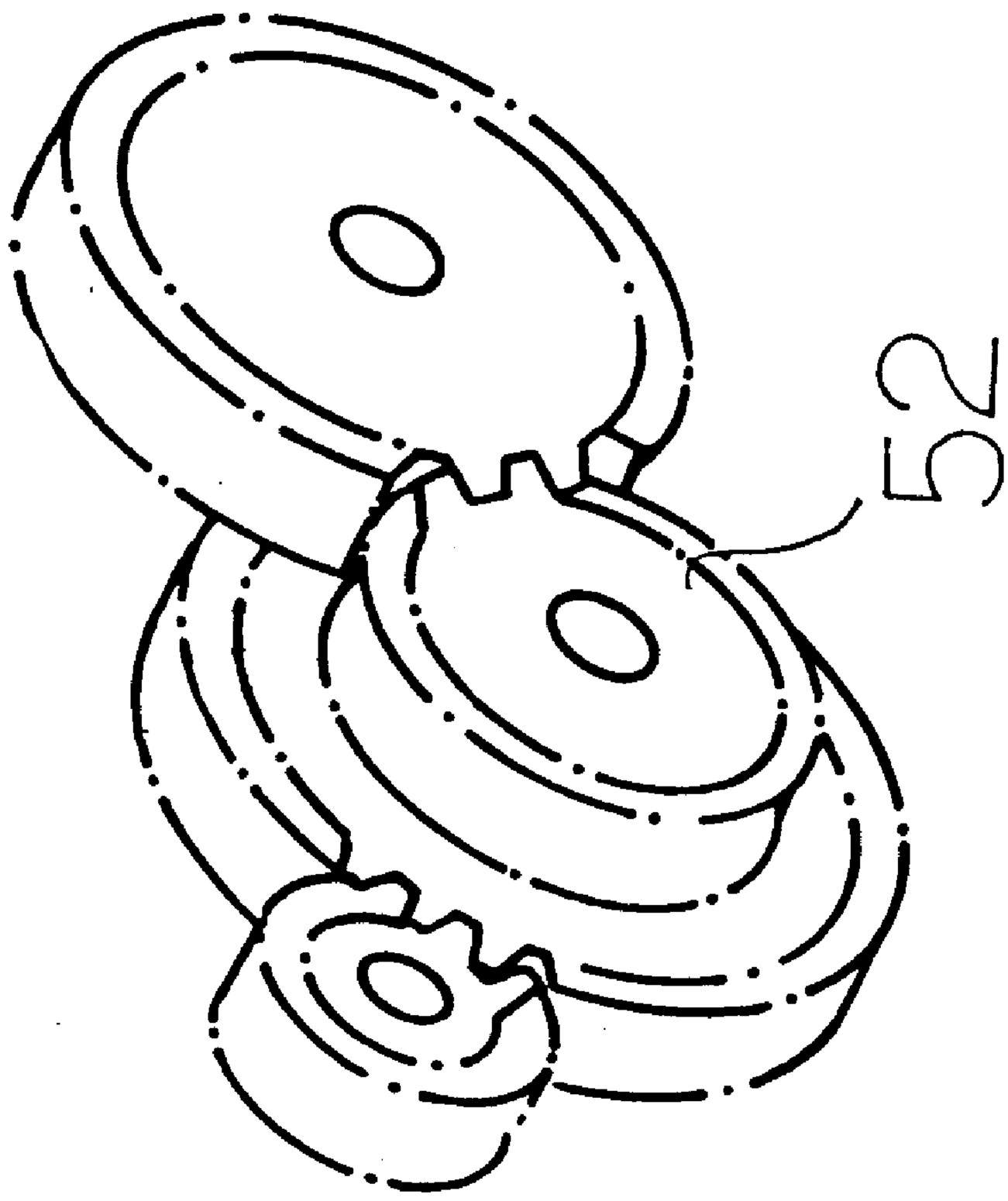


FIG.10

DOOR LOCK DEVICE

FIELD OF THE INVENTION

The present invention relates to a door lock device. More particularly, the present invention relates to a door lock device which is detached easily.

DESCRIPTION OF THE RELATED ART

A conventional door lock device has a dead bolt and a latch bolt. However, the latch bolt will block a door while the door is opened. Furthermore, a doorknob is often protruded from an outer face of the door. Thus a child may bump into the doorknob accidentally. If a core of the conventional door lock device is broken, the whole door lock device should be replaced.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a door lock device which can be disassembled easily. Thus a core of the door lock device can be replaced easily.

Another object of the present invention is to provide a door lock device which has a case frame having an upper hollow cylinder inserted through an upper through hole of a door and a lower hollow cylinder inserted through a lower through hole of the door so that an outer face of the case frame can contact an outer face of the door flatly.

Another object of the present invention is to provide a door lock device which has a drive mechanism having a rack to drive a latch bolt device so that the latch bolt device will not block a door while the door is opened.

Another object of the present invention is to provide a door lock device which has a torsion spring to force a first pressing plate contacting a case frame while the first pressing plate is not operated.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective exploded view of a door lock device of a preferred embodiment in accordance with the present invention;

FIG. **2** is a perspective exploded view of a case frame, a latch bolt device, a decoration plate, and pressing plate;

FIG. **3**A is a schematic view illustrating an engagement of a latch bolt device and a drive mechanism;

FIG. **3**B is another schematic view illustrating an engagement of a latch bolt device and drive mechanism;

FIG. **4**A is a schematic view illustrating an application of a door lock device while the door lock device is locked;

FIG. **4**B is a schematic view illustrating an application of a door lock device while the door lock device is unlocked;

FIG. **5** is a schematic view illustrating an engagement of a protruded block of a pressing device and an elastic block of a lock fastener device;

FIG. **6**A is a schematic view illustrating a first pressing plate disposed on a case frame while the first pressing plate is not operated;

FIG. **6**B is a saschematic view illustrating a drive mechanism driving a latch bolt device to extend;

FIG. **7**A is a schematic view illustrating a first pressing plate disposed on a case frame while the first pressing plate is operated;

FIG. **7**B is a schematic view illustrating a drive mechanism driving a latch bolt device to retract;

FIG. **8** is a perspective exploded view of a door lock device of another preferred embodiment in accordance with the present invention; and

FIG. **9** is a schematic view illustrating an application of a door lock device of another preferred embodiment in accordance with the present invention.

FIG. **10** is a perspective view of a door lock device of the preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. **1** to **7**B, a door lock device is disposed on a door **1**. The door **1** has an upper through hole **11** and a lower through hole **12**. The door lock device includes a latch bolt device **6** disposed on the door **1**, a case frame **2** having an upper hollow cylinder **22** inserted through the upper through hole **11** and a lower hollow cylinder **23** inserted through the lower through hole **12**, a first pressing plate **8** disposed on the case frame **2**, and a drive mechanism **5** disposed in the upper hollow cylinder **22**.

The case frame **2** further has a recess **21**. A core **3** has a driven block **31**. A lock fastener device **4** has a lateral elastic block **42** and a blocking bar **41**.

The upper hollow cylinder **22** has an inner groove **222**, a lateral slot **221**, and a core seat **223** receiving the core **3** and the lock fastener device **4**. The core seat **223** has a bottom hole **224**.

The drive mechanism **5** has a rack **53** to drive the latch bolt device **6**, and a drive frame **51** having a gear set **52** to drive the rack **53**. The rack **53** has an upper groove **532**. The rack **53** passes through the lateral slot **221** to connect to the latch bolt device **6**. A pressing device **81**' is disposed in the upper hollow cylinder **22** to connect to the drive frame **51**. The pressing device **81**' has a protruded block **82**'.

The blocking bar **41** is inserted in the upper groove **532**. A compression spring S is disposed between the drive frame **51** and the rack **53**. A torsion spring S**1** is disposed between the core **3** and the lock fastener device **4**.

The first pressing plate **8** has an upper pressing portion **81**. The recess **21** receives the first pressing plate **8**.

A locking plate **71** covers the upper through hole **11** and the lower through hole **12**.

A decoration plate **72** is disposed on the locking plate **71**. The decoration plate **72** has an opening **73**. A second pressing plate **8**' is disposed on the decoration plate **72**. The opening **73** receives the second pressing plate **8**'. An upper portion of the second pressing plate **8**' is connected to the pressing device **81**'.

The compression spring S pushes the latch bolt device **6** to extend (as shown in FIG. **3**A). When the compression spring S is compressed, the latch bolt device **6** retracts (as shown in FIG. **3**B).

Referring to FIG. **6**B, the blocking bar **41** is inserted in the upper groove **532**. The lateral elastic block **42** is inserted in the bottom hole **224** (as shown in FIG. **4**A). Since the blocking bar **41** is inserted in the upper groove **532**, the latch bolt device **6** locks the door **1**.

When the second pressing plate **8**' is operated, the protruded block **82**' contacts the lateral elastic block **42** to force the lateral elastic block **42** to retract (as shown in FIG. **5**). When the core **3** is rotated to contact the lateral elastic block **42**, the core **3** forces the lateral elastic block **42** to retract.

When the lateral elastic block **42** disengages from the bottom hole **224**, the torsion spring S**1** pushes the lateral elastic block **42** to move (as shown in FIG. **4**B).

Referring to FIGS. **8** and **9**, a connection frame **92** is disposed between the upper portion of the second pressing

plate **8'** and the pressing device **81'**. A link **91** has a first end connected to the connection frame **92** and a second end connected to the second pressing plate **8'**. The user can press the second pressing plate **8'** to produce a pressing force.

What is claimed is:

1. A door lock device for a door **(1)**, the door having an upper through hole **(11)** and a lower through hole **(12)**, the door lock device comprising:

a latch bolt device **(6)** adapted to be disposed on the door **(1)**;

a case frame **(2)** having an upper hollow cylinder **(22)** adapted to be inserted through the upper through hole **(11)** and a lower hollow cylinder **(23)** adapted to be inserted through the lower through hole **(12)**;

a first pressing plate **(8)** disposed on the case frame **(2)**;

a drive mechanism **(5)** disposed in the upper hollow cylinder **(22)**;

the case frame **(2)** further comprises a recess **(21)**;

a core **(3)** has a driven block **(31)**;

a lock fastener device **(4)** has a lateral elastic block **(42)** and a blocking bar **(41)**;

the upper hollow cylinder **(22)** has an inner groove **(222)**, a lateral slot **(221)**, and a core seat **(223)** receiving the core **(3)** and the lock fastener device **(4)**;

the core seat **(223)** has a bottom hole **(224)**;

the drive mechanism **(5)** has a rack **(53)** to drive the latch bolt device **(6)**;

a drive frame **(51)** having a gear set **(52)** adapted to drive the rack **(53)**;

the rack **(53)** has an upper groove **(532)**;

the rack **(53)** passes through the lateral slot **(221)** to connect to the latch bolt device **(6)**;

a pressing device **(81')** is disposed in the upper hollow cylinder **(22)** to connect to the drive frame **(51)**;

the pressing device **(81')** includes a protruded block **(82')**;

the blocking bar **(41)** inserted in the upper groove **(532)**;

a compression spring (S) is disposed between the drive frame **(51)** and the rack **(53)**;

a torsion spring (S1) is disposed between the core **(3)** and the lock fastener device **(4)**;

the first pressing plate **(8)** has an upper pressing portion **(81)**;

the recess **(21)** receives the first pressing plate **(8)**;

a locking plate **(71)** covers the upper through hole **(11)** and the lower through hole **(12)**;

a decoration plate **(72)** is disposed on the locking plate **(71)**;

the decoration plate **(72)** has an opening **(73)**;

a second pressing plate **(8')** is disposed on the decoration plate **(72)**; and

the opening **(73)** receives the second pressing plate **(8')** and an upper portion of the second pressing plate **(8')** is connected to the pressing device **(81')**.

2. The door lock device as claimed in claim **1**, wherein a connection frame **(92)** is disposed between the upper portion of the second pressing plate **(8')** and the pressing device **(81')**, and the door lock device further comprises a link **(91)** with a first end connected to the connection frame **(92)** and a second end connected to the second pressing plate **(8')**.

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